Patent claims

1. A vehicle sensor (4) for detecting impact sound, said sensor comprising a measured-value sensor (4.1) for detecting the impact sound, the measured-value sensor (4.1) comprising several individual, separate measured-value sensing elements (4.1.x), each of which is coupled to a vehicle structure (5) in such a way that impact sound waves are transmitted by the vehicle structure (5) to the measured-value sensing elements (4.1.x).

2. A vehicle sensor according to claim 1,
characterized in that
the measured-value sensing elements (4.1.x) are coupled to the vehicle structure (5) in such a way that longitudinal and/or transversal impact sound waves are transmitted by the vehicle structure (5) to the measured-value sensing elements (4.1.x).

3. A vehicle sensor according to claim 1 or 2,
characterized in that
the measured-value sensing elements (4.1.x) are coupled to the vehicle structure (5) by an elastic (7.1) or a visco-elastic (7.2) coupling layer for transmitting the impact sound waves.

4. A vehicle sensor according to claim 3,
characterized in that
the visco-elastic coupling layer (7.2) is formed as a mutual layer extending over the surface of all measured-value sensing elements (4.1.x) between the measured-value sensing elements (4.1.x) and the vehicle structure (5) or is embodied in form of separate nubs (7.2.1) between the measured-value sensing elements (4.1.x) and the vehicle structure (5).

5. A vehicle sensor according to claim 3,
characterized in that
between the measured-value sensing elements (4.1.x) and the vehicle structure (5) a matrix (7.2.4) is arranged, which comprises recesses between the measured-value sensing elements (4.1.x) and the vehicle structure (5), the visco-elastic coupling layer (7.2) being embodied in form of fillings (7.2.3) of these recesses.

6. A vehicle sensor according to one of the preceding claims,
characterized in that
the measured-value sensing elements (4.1.3, 4.1.4) are arranged in form of a facet structure or of an array.

7. A vehicle sensor according to claim 6,
characterized in that
it comprises at least eight measured-value sensing elements (4.1.3, 4.1.4).

8. A vehicle sensor according to one of claims 1 to 5,
characterized in that
the measured-value sensing elements (4.1.5, 4.1.6) are arranged in form of a digital structure or of a self-testing structure.

9. A vehicle sensor according to claim 8,
characterized in that
it comprises at least two measured-value sensing elements (4.1.5, 4.1.6).

10. A vehicle sensor according to one of the preceding claims,
characterized in that
the dimensions of the measured-value sensing elements (4.1.x) are smaller than the smallest wave length to be detected of the impact sound.

11. A vehicle sensor according to one of claims 1 to 9,
characterized in that
the dimensions of the measured-value sensing elements (4.1.x) are greater than the greatest wave length to be detected of the impact sound.

12. A vehicle sensor according to one of the preceding claims,
characterized in that
the measured-value sensor (4.1) is a piezoelectric, piezoresistive or capacitive measured-value sensor.

13. A vehicle sensor according to one of the preceding claims,
characterized in that
it comprises a carrier (4.3) for the measured-value sensor (4.1), which is embodied as a substrate, a wiring carrier or a foil.

14. A vehicle sensor according to claim 13,
characterized in that
the measured-value sensor (4.1) is connected to the carrier (4.3) via a force-fit and form-fit connection (4.8.1, 4.8.3).

15. A vehicle sensor according to claim 14,
characterized in that
the form-fit connection (4.8.1, 4.8.3) between the measured-value sensor (4.1) and the carrier (4.3) is a glued spot or a contact layer.

16. A vehicle sensor according to one of the preceding claims,
characterized in that
it comprises in addition an acceleration sensor (4.4).

17. A vehicle sensor according to one of the preceding claims,
characterized in that
the measured-value sensing elements (4.1.x) are coupled to the vehicle structure (5) via at least one mechanical contact point (11.1) for

transmitting the impact sound waves.

18. A vehicle sensor according to claim 17,
characterized in that
the mechanical contact point (11.1) is cone shaped, the base area of the cone being circular or oval.

19. A vehicle sensor according to claim 17 or 18,
characterized in that
the distances between the mechanical contact points (11.1) are smaller than the smallest wave length to be detected of the impact sound.

20. A vehicle sensor according to claim 17 or 18,
characterized in that
the distances between the mechanical contact points (11.1) are greater than the greatest wave length to be detected of the impact sound.

21. A safety device for a vehicle with at least one vehicle sensor (4) according to the preceding claims.

22. A diagnostic device for a vehicle with at least one vehicle sensor (4) according to the preceding claims.

23. Use of a vehicle sensor according to one of the claims 1 to 20 for evaluating superimposed impact sound waves, which are independent from each other or for differentiating between superimposed impact sound waves, which are independent from each other, as a variable band pass and/or effective value creator or as a parameter estimator or for the determination of statistic characteristics.